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Superhyperfine structure of the EPR spectra of Ce3+ ions in LiRF4 (R = Y, Lu, Tm) double fluorides

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Abstract

The EPR spectra of Ce3+ impurity ions in LiYF4, LiLuF4, and LiTmF4 double-fluoride single crystals have been investigated at a frequency of ~9.3 GHz in the temperature range 5-25 K. The effective g factors of the ground Kramers doublet of the cerium ions in three crystals are close to each other (g{norm of matrix} = 2.737, g⊥ = 1.475 for LiYF4:Ce3+). A superhyperfine structure of the EPR spectrum of Ce3+ ions in the LiTmF4 Van Vleck paramagnet has been observed in the external magnetic field B oriented along the crystallographic axis c (B {norm of matrix} c). The superhyperfine structure of the EPR soectra of the Ce3+ ions in the LiYF4 and LiLuF4 diamagnetic matrices is resolved for B ⊥ c. Possible factors responsible for this pronounced difference in the properties of the systems studied have been discussed. © 2010 Pleiades Publishing, Ltd.

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